Electricity Act 1989
Town & Country Planning (Scotland) Act 1997
DPEA Code of Practice

Tealing to Kintore OHL proposal TRL-120-1

CHS Statement: Roads and Bridges, by Fraser Smith

I am Fraser Smith. I am an engineer. The areas through which the Kintore to Tealing OHL is proposed to be built is overwhelmingly rural. The roads that cris cross that area were created many, many years ago to cope with horse and cart to transport light loads. Small bridges were built in random masonry with soft lime mortar that could cope with the small deflections that occur with such bridges under such loadings. In the many years that have passed since their construction, it is extremely likely that the load bearing arch ring has never been properly maintained.

We now have huge loads being taken over these bridges and that causes greater deflections that then cause cracks in the mortar and slowly allow small amounts of the mortar to be lost. In addition to this deterioration, water entering the bridge construction will leach out the lime leaving just sand. Slowly, but surely, the depth of the pointing will be reduced and the load path in the arch ring will be flattened causing the stress between voussoirs to increase. It can also allow individual voussoirs to find themselves with no mortar around them and they fall out, weakening the structure, possibly leading to an unravelling of the voussoirs.

With the changing climate, high intensity rainfall events are becoming more common in the hills north of the Highland Boundary Fault that cause spate run-offs into the small burns to turn them into raging torrents. These torrents pass under these old bridges and wash away even more mortar from the arch ring leaving these bridges in an even more damaged state. Constraints on council funding mean that many of these defects are never picked up until there is a failure.

As to the rural roads themselves, they would have been very lucky to have seen much in the way of a build up of load bearing layers that are able to distribute wheel loads over a greater area that reduce the stress on the formation as modern major roads do. The high stresses produced at the formation by lorries carrying concrete, stone or counter weights for large cranes for example causes the formation to be distorted. The outcome of this is then reflective cracking where the surface material just crumbles away. This problem is made worse because these roads do not have kerb logs and kerbs to constrain outward movement and they have no way of dealing with ground water under the formation and that makes it easier for the soil particles to move past each other facilitating the outward and downward movement of the verges. This is enhanced on narrow lanes due to vehicles taking up the whole width of the road so applying their loading right at the edges.

From the behaviour of lorries under SSEN control seen on previous works where drivers have failed to respect the routeing required, we predict that there will be significant damage caused to the roads and bridges along the alignment. It would therefore be necessary for all bridges that TKUP vehicles will drive across to be thoroughly inspected and repaired to a high standard using pointing

of lime mortar (cement mortar should NEVER be used on these structures). All roads to be used should have drained ditches created either side to allow ground water to be taken away from the formation and proper kerbs and kerb logs to contain the formation and the road bed. Roads must be in a better condition after any works than before.

Fraser Smith BSc, PhD, CEng, MICE